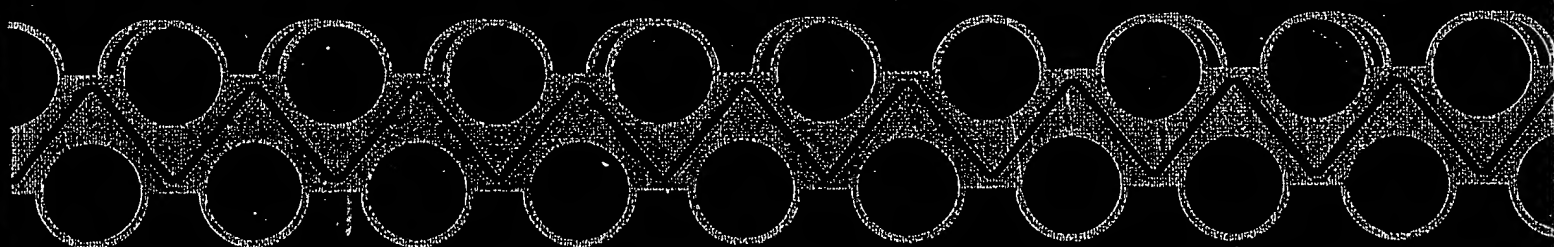


**CONCISE  
ENCYCLOPEDIA  
OF POLYMER  
SCIENCE AND  
ENGINEERING**



# CONCISE ENCYCLOPEDIA OF POLYMER SCIENCE AND ENGINEERING

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Jacqueline I. Kroschwitz, *Executive Editor*



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## Bonding

Plastic bonds may be created in four general ways: mechanically, (Fig. 1) adhesively, through the use of fasteners (Fig. 2), and by fusion or melting techniques. Within each general method there are a variety of submethods (ie, fusion: spin welding, sonic welding, etc). While each bonding method can potentially achieve material-tearing strength, fusion methods are limited to bonding identical or melt-compatible polymers. The choice of the "best" bonding technique anticipates the potential failure modes and incorporates safeguards within the bond design. Maximum productivity is achieved through minimum fixture

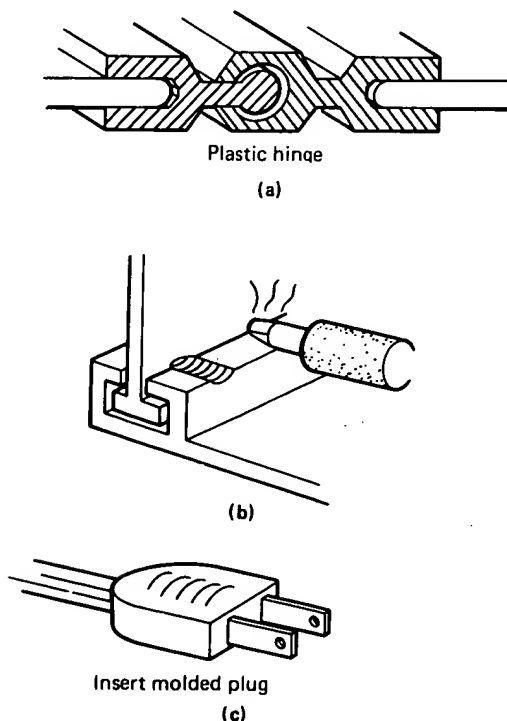
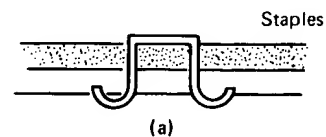


Figure 1. Mechanical bonding. (a) Temporary mechanical bond; (b) staking (prevents "rattle," but will not produce rivets); (c) permanent mechanical bond.

or clamp times, the ability to automate and the overall bond "system cost" (not merely the bonding "prices"). Productivity and bond quality assurance can be accomplished non-destructively, if thought is given to applying NDT during evolution of the bond design.



Example:

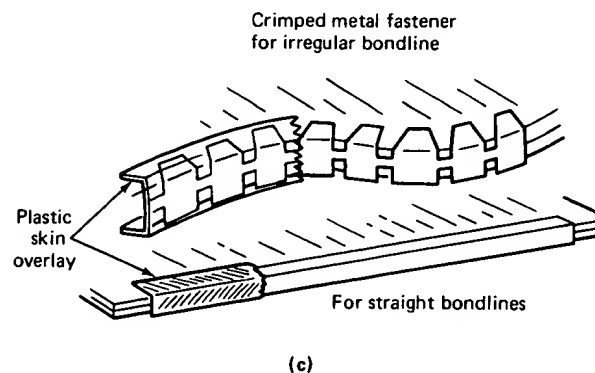
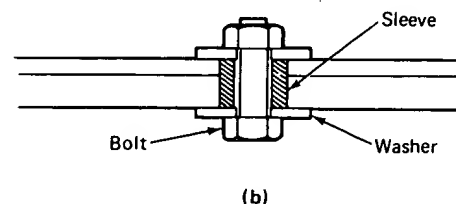


Figure 2. Fastener bonding. (a) Temporary fastener bond and permanent fastener bonds must be stabilized against compression of plastics by employing special designs; (c) crimped metal fastener avoid compression set by uniform stress distribution.

Effective plastic bonding requires that the same amount of time given to the selection of a technique be given to considering other bonding aspects. These other, critically important aspects are bond design, probable failure modes, physical testing methods, NDT capability, and productivity. The success of joining plastics depends equally on all these bond subsystems.

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